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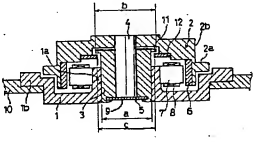
(54) DYNAMIC PRESSURE BEARING SPINDLE MOTOR

(57) Abstract:

PURPOSE: To enable effective assembling to realize low cost fabrication by providing a projected area on a sleeve and a stopper metal which collides with the projected area to restrict removal thereof to result in the specific relationship between the housing and diameter of sleeve engaged therewith.

CONSTITUTION: A motor is so structured that when a rotor hub 2 moves in the thrust direction, a stopper metal 12 collides with a projected area 11 of sleeve 3 to restrict removal thereof. In the case of assembling, a stator assembling body, a sleeve bearing assembly body and a rotor assembling body are respectively formed. Next, a lubrication oil is supplied into the sleeve 3 of the sleeve bearing assembling body and the stopper metal 12 is fixed to the rotor hub 2 in the condition of the motor subassembling body where the shaft 4 of the rotor assembling body is inserted. Thereafter, the sleeve 3 is inserted and fixed in a cylindrical part 1a of the stator assembling body. In this case, when the diameter of sleeve 3 is defined as (a), diameter of projected area 11 as (b) and internal diameter of stopper metal 12 as (c), the relationships a<b and a<c and b>c are necessary. As a result, effective assembling can be enabled to realize low cost fabrication.



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CLAIMS

[Claim(s)]
[Claim 1] Housing. It is the rotor hub section which can rotate freely to housing. The sleeve section fixed to housing. The shaft which fitted into the sleeve section free [rotation] and was fixed to the rotor hub section. The radial hydrodynamic bearing which was equipped with the thrust board countered and arranged at the shaft end face at the sleeve section, and was filled up with the lubricating oil between the peripheral surfaces of a thrust board, the thrust bearing which filled up the relative sliding surface of a shaft end face with the lubricating oil, a shaft, and the sleeve section. Are the hydrodynamic bearing spindle motor equipped with the above, and a salient is prepared in the sleeve section. If it moves in the thrust direction at a rotor hub section side, will prepare the stops escaped from and regulated in contact with a salient, and the bore of b and stops is set [the path of the fitting section with housing of the sleeve section] to c for the outer diameter of a and a salient. a<b and -- a<c and -- It has the relation of b>c and is characterized by the path from the salient of the sleeve section to the fitting section with housing being below a bore of stops.
[Claim 2] Housing. It is the rotor hub section which can rotate freely to housing. The sleeve section fixed to housing. The shaft which fitted into the sleeve section free [rotation] and was fixed to the rotor hub section. The radial hydrodynamic bearing which was equipped with the thrust board countered and arranged at the shaft end face at the sleeve section, and was filled up with the lubricating oil between the peripheral surfaces of a thrust board, the thrust bearing which filled up the relative sliding surface of a shaft end face with the lubricating oil, a shaft, and the sleeve section. Are the hydrodynamic bearing spindle motor equipped with the above, and a salient is prepared in the sleeve section. If it moves in the thrust direction at a rotor hub section side, will prepare the stops escaped from and regulated in contact with a salient, and the bore of b and stops is set [the path of the fitting section with housing of the sleeve section] to e for the outer diameter of a and a salient. a>=b and -- a>e and -- It is characterized by having the relation of b>e, having stopped the hole of the radius of curvature more than the overall diameter of the range from the thrust board side of the sleeve section to a salient, and forming in detail.
[Claim 3] The hydrodynamic bearing spindle motor according to claim 1 or 2 characterized by having stopped from the axis-of-rotation heart in the state where the stop implement was formed and built into the configuration which contacts a salient partially, having stopped the distance to the inner circumference of an ingredient, and being referred to as 1/2 of the bore of an ingredient.
[Claim 4] The hydrodynamic bearing spindle motor according to claim 1 or 2 characterized by constituting housing in the chassis of equipment, and one.
[Claim 5] A thrust board is a hydrodynamic bearing spindle motor according to claim 1 or 2 characterized by having been fixed to the sleeve section in the caulking and making the diameter of a sleeve outside near the caulking section into the outer diameter which does not contact the inner circumference of a body into which the sleeve section of housing fits.
[Claim 6] The hydrodynamic bearing spindle motor according to claim 1 or 2 characterized by having had Rota which fixed the rotor hub section and the Rota frame which fixed the magnet, and constituting stops from a Rota frame.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] this invention relates to the hydrodynamic bearing spindle motor using hydrodynamic bearings mainly used for the disk driving gear of the disk of a minor diameter (1.8 inches and 2.5 inches or less), such as light and a magnetic disk.
[0002]
[Description of the Prior Art] In recent years, light and a magnetic disk unit tend to progress to the formation of small lightweight, and high capacity-ization. the correspondence to a miniaturization and thin-shape-izing also avoids a spindle motor with the spread of the personal computers of note size -- not having -- in addition -- and shock-proof improvement and highly precise-ization are demanded Many small ball bearing has been adopted as bearing used for the conventional spindle motor. However, if small ball bearing is used with the formation of a small outer diameter of a spindle motor, sufficient rotational accuracy is not obtained, but realization of high-capacity-izing will be difficult, and shock-proof ability will fall extremely, ball bearing will be degraded, and the noise problem will be generated.
[0003] By the rotational accuracy of ball bearing, I hear that high capacity-ization cannot be attained and the dynamic pressure spindle motor using the fluid hydrodynamic bearing which was full of the lubricating oil is developed recently.
[0004] Hereafter, the example of composition of the spindle motor using the conventional hydrodynamic bearing for magnetic-disk driving gears is explained with reference to drawing 12 . For housing of a motor, and 32, as for the sleeve section and 34, in drawing 12 , the rotor hub section and 33 are [31 / a shaft and 35] thrust boards. Moreover, as for a stator core and 38, the magnet with which 36 was fixed to the rotor hub section 32, and 37 are [a coil and 39] stop rings.
[0005] Body 31a and flange 31b are prepared in the housing 31 of a motor, and the periphery of flange 31b is attached in the chassis of a disk driving gear. On the periphery of body 31a, the stator core 37 by which the coil 38 was ****(ed) has fixed. The rotor hub section 32 was constituted by the cup configuration, and the magnet 36 of the shape of a cylinder which magnetized N pole and the south pole by turns to the hoop direction has fixed it to the tubed part inner circumference.
[0006] The sleeve section 33 is fixed to the inner circumference of body 31a, and caulking fixation of the thrust board 35 is carried out at this sleeve section 33. The sleeve section 33 and the interior surrounded with the thrust board 35 are filled up with a lubricating oil, and the shaft 34 fixed to the axis section of the rotor hub section 32 is inserted. And a thrust pivot hydrodynamic bearing is constituted for a radial hydrodynamic bearing between the end face of a shaft 34, and the thrust board 35 between the periphery of a shaft 34, and the inner circumference of the sleeve section 33 again, and a shaft 34 rotates relatively through a lubricating oil to the sleeve section 33. Since it is fixed to the axis section of the rotor hub section 32, the rotor hub section 32 carries out relative rotation, and this shaft 34 also rotates the Rota frame fixed to the rotor hub section 32.
[0007] If it is inserting in annular crevice 32b by which height 39a of the stop ring 39 was formed in the inner circumference of the rotor hub section 32 and the rotor hub section 32 moves in the thrust direction, it engages with the stop ring 39 fixed to the sleeve section 33, and it is constituted so that the rotor hub section 32 may not fall out.
[0008] Next, the assembly procedure of the hydrodynamic bearing spindle motor of the above-

mentioned composition is e[redacted]ined. The stator core 37 ****(ed) by h[redacted]ng 31 in the coil 38 is fixed, the sleeve section 33 [redacted]ade to fit into body 31a of housing 31, [redacted]esion fixation is carried out, and caulking fixation of the thrust board 35 is carried out at the sleeve section 33. Fixation of the sleeve section 33 is assembled so that the distance between disk receptacle side 32a of the rotor hub section 32 and flange 31b may become the set point. Next, a shaft 34 is fixed to the rotor hub section 32 which fixed the magnet 36, it stops to annular crevice 32a of the rotor hub section 32, and a ring 39 is inserted. Since the insertion method cannot be simply inserted in shaft orientations, it levels the stop ring 39 which the stop ring 39 was made to incline and inserted a part of height 39a in annular crevice 32a and which carried out the backward tilt. Next, it equips with the rotor hub section 32 which inserted the stop ring 39, after lubricating the sleeve section 33 with a lubricating oil. In that case, it stops from work hole 32c prepared in the rotor hub section 32 from the middle, and presses down and equips with a ring 39. Moreover, before equipping the sleeve section 33 with the rotor hub section 32, adhesives are applied, and the sleeve section 33 is made to carry out adhesion fixation of the stop ring 39 after wearing.

[0009]

[Problem(s) to be Solved by the Invention] However, in the above-mentioned conventional hydrodynamic bearing spindle motor, since masking arrival of the stop ring 39 was carried out to the rotor hub section 32 and the shaft 34 was inserted in the sleeve section 33, it needed to equip by changing the stop ring 39 into the sleeve section 33 and a coaxial state, and could respond only by the handicraft, but there was a problem that working efficiency was bad and could not attain rationalization of assembly.

[0010] Moreover, by the fixed method by the above adhesives, it needed to wait until adhesives hardened completely, it could not progress to the following process until adhesives carried out full hardening, but there was a problem that the number of erectors could not be reduced.

[0011] In view of the above-mentioned conventional trouble, this invention can attain rationalization of assembly and aims at offering the hydrodynamic bearing spindle motor which can be manufactured cheaply.

[0012]

[Means for Solving the Problem] The hydrodynamic bearing spindle motor of this invention receives housing and housing. The rotor hub section which can rotate freely, The sleeve section fixed to housing, and the shaft which fitted into the sleeve section free [rotation] and was fixed to the rotor hub section, The thrust bearing which was equipped with the thrust board countered and arranged at the shaft end face at the sleeve section, and filled up the relative sliding surface of a thrust board and a shaft end face with the lubricating oil, In the hydrodynamic bearing spindle motor which prepared the radial hydrodynamic bearing filled up with the lubricating oil between the peripheral surfaces of a shaft and the sleeve section If a salient is prepared in the sleeve section and it moves in the thrust direction at a rotor hub section side, will prepare the stops escaped from and regulated in contact with a salient, and the bore of b and stops is set [the path of housing and the sleeve section which fits in] to c for the outer diameter of a and a salient. a<b and -- a<c and -- It has the relation of b>c and is characterized by the path from the salient of the sleeve section to the fitting section with housing being below a bore of stops.

[0013] Moreover, if a salient is prepared in the sleeve section and it moves in the thrust direction at a rotor hub section side, will form the stop implement escaped from and regulated in contact with a salient, and the bore of b and a stop implement is set [the path of housing and the sleeve section which fits in] to e for the outer diameter of a and a salient. a>=b and -- a>e and -- It has the relation of b>e, the hole of the radius of curvature more than the overall diameter of the range from the thrust board side of the sleeve section to a salient may be stopped, and you may form in detail.

[0014] Moreover, it is good also considering the distance from the axis-of-rotation heart in the state where the above-mentioned stops were formed and included in the configuration which contacts a salient partially to the inner circumference of stops, as 1/2 of the bore of stops. Moreover, you may constitute housing in the chassis of equipment, and one.

[0015] Moreover, as for a thrust board, it is desirable to fix to the sleeve section in a caulking and to make the diameter of a sleeve outside near the caulking section into the outer diameter which does not contact the inner circumference of a body into which the sleeve section of housing fits.

[0016] Moreover, the Rota [redacted]e which fixed the magnet may be fixed [redacted]he rotor hub section, Rota may be constituted, and stop[redacted]ay consist of the Rota frame.
[0017]
[Function] The stator assembly which fixed the stator core ****(ed) by housing in the coil according to the hydrodynamic bearing spindle motor of this invention, The sleeve bearing assembly which fixed the thrust board to the sleeve section, and the Rota assembly which fixed the shaft to the rotor hub section which fixed the magnet are made. Lubricate bearing of a sleeve bearing assembly with a lubricating oil, insert the shaft of the Rota assembly, and a motor sub assembly is made. A motor can be assembled by fixing stops to the rotor hub section in the state of this motor sub assembly, inserting the sleeve section in housing of a stator assembly, and fixing to it after that. Thus, since assembly is possible with a built-in method, working efficiency becomes good and rationalization of assembly can be attained.
[0018] Moreover, it can assemble similarly by stopping, even when the path of the fitting section with housing of the sleeve section is larger than the path of a salient, and forming the hole of the radius of curvature more than the overall diameter of the range from the thrust board side of the sleeve section to a salient in detail.
[0019] Moreover, even if stops are configurations which contact a salient partially, they can be assembled similarly, and even if housing is the chassis of equipment, and one, they can be assembled similarly.
[0020] Moreover, by making a path small near the caulking section of the thrust board of the sleeve section, although a path swells by the caulking, the sleeve section can be smoothly inserted and fitted in in housing.
[0021] Moreover, it is not necessary to prepare stops separately and, in the Rota composition which attached the Rota frame in the rotor hub section, part mark and the number of erectors can be lessened by making the Rota frame into stops.
[0022]
[Example] Hereafter, the example of the spindle motor of this invention is explained, referring to a drawing.
[0023] (Example 1) The 1st example which applied this invention to the hydrodynamic bearing spindle motor for disk driving gears is explained with reference to drawing 1 . For housing of a motor, and 2, as for the sleeve section and 4, the rotor hub section and 3 are [1 / a shaft and 5] thrust boards. Moreover, as for the magnet with which 6 was fixed to the rotor hub section 2, and 7, a stator core and 8 are coils. The height to which 11 protruded on the upper-limit periphery of the sleeve section 3, and 12 are the stops fixed to the rotor hub section 2.
[0024] Body 1a is prepared in the inner circumference section, flange 1b is prepared in the housing 1 of a motor at the periphery section, the sleeve section 3 is attached in the inner circumference of body 1a, and the periphery of flange 1b is attached in the chassis 10 of a disk driving gear. On the periphery of body 1a, the stator core 7 by which the coil 8 was ****(ed) has fixed. The rotor hub section 2 is constituted by the cup configuration which had magnetic-disk receptacle side 2a and inside-diameter-calibration body 2b of a magnetic disk formed, and rotates focusing on the shaft 4 concluded in the center. To the tubed part inner circumference of the rotor hub section 2 of a cup configuration, the magnet 6 of the shape of a cylinder which magnetized N pole and the south pole by turns to the hoop direction has fixed.
[0025] If current is energized in a coil 8, a magnetic field will occur in the salient pole of a stator core 7, torque will occur between the magnets 6 for fields which countered the stator core 7, and the rotor hub section 2 will rotate. Therefore, the magnetic disk (not shown) clamped in the rotor hub section 2 rotates.
[0026] While the thrust board 5 fixes in a caulking in the soffit section of the sleeve section 3 fixed to body 1a of the inner circumference section of housing 1, the interior is filled up with the lubricating oil as fluid matter. The hydrodynamic bearing slot 9 which consists of a spiral-like slot is formed in the thrust board 5, it is supported free [rotation] in the thrust direction with the dynamic pressure generated in the end face of the thrust board 5 and a shaft 4 with rotation of a shaft 4, and a shaft 4 is supported free [rotation] by the sleeve section 3 and non-contact by the dynamic pressure generated to the lubricating oil also in the direction of a radial.

[0027] If the rotor hub section 2 moves in the thrust direction, the height [redacted] to which the stops 12 fixed to this rotor hub section [redacted] protruded on the sleeve section 3 is controlled, and it is constituted so that the rotor hub section 2 may not slip out.
[0028] Next, the assembly procedure of the hydrodynamic bearing spindle motor of the above composition is explained.
[0029] The stator assembly which fixed the stator core 7 ****(ed) by housing 1 in the coil 8, the sleeve bearing assembly which fixed the thrust board 5 to the sleeve section 3, and the Rota assembly which fixed the shaft 4 to the rotor hub section 2 which fixed the magnet 6 are made, respectively. Next, a lubricating oil is lubricated into the sleeve section 3 of a sleeve bearing assembly, the shaft 4 of the Rota assembly is inserted, and a motor sub assembly is made. And stops 12 are fixed to the rotor hub section 2 in the state of this motor sub assembly. Then, stops 12 are in the state which can engage with the height 11 which protruded on the upper-limit outside periphery of the sleeve section 3 from a lower part. Then, assembly is completed by inserting the sleeve section 3 in body 1a of the housing 1 of a stator assembly, and fixing. In order to assemble in the above-mentioned procedure, a part size target has restrictions. First, in order to let stops 12 pass to a sleeve 3 in the state of a motor sub assembly, the bore of stops 12 needs to be a bigger path than the path from the thrust board 5 side of the sleeve section 3 to a height 11, and, naturally needs to make the path of a height 11 larger than the bore of stops 12 more greatly than the path of the sleeve section 3.

[0030] therefore -- if the bore of b and stops 12 is set [the path of the sleeve section 3 which fits into the inner circumference of body 1a of housing 1] to c for the path of the height 11 of a and the sleeve section 3 a<b and -- a<b and -- b>c ... (1)
****** is realized.
[0031] (Example 2) Next, the 2nd example of this invention is explained, referring to drawing 2 and drawing 3 . In addition, in explanation of the following examples, the reference number same about the same component as the 1st example shown in drawing 1 is attached, explanation is omitted, and only difference is explained.
[0032] In drawing 2 and drawing 3 , stops 13 which are different in the stops 12 of the 1st example are used by this example. Stops 13 are circular, the big portion 14 of the diameter of curvature is formed in the inner circumference side from the outer diameter a of the sleeve section 3, it is in the state which attached stops 13, and this portion 14 is constituted by a part of height 11 of the sleeve section 3 possible [contact].
[0033] In the state where these stops 13 were included in the motor, if the curtate distance from the axis of a shaft 4 to the portion 14 of stops 13 is set to d, the relation which transposed c of (1) formula to d to which it is given by the following (2) formulas theoretically will be realized.
[0034] 2 d=c .... (2)
In this example, upper shell insertion cannot be carried out through sleeve 3 outer diameter, but it can insert and equip with stops 13 from a side so that drawing 3 may show. Thus, since it inserts from a side, various configurations can respond about stops 13. Moreover, after attaching stops 13 in a motor sub assembly like the 1st example, if a stator assembly is fixed to the motor sub assembly, it will become the hydrodynamic bearing spindle motor of a built-in type.
[0035] (Example 3) Next, the 3rd example of this invention is explained with reference to drawing 4 . In drawing 4 , the housing section 15 consists of this examples in [a point which is fundamentally different from the 1st example of the above with the same composition / the chassis 10 of a disk driving gear] one. Moreover, thrust bearing consists of pivot bearing 16. Since the housing section 15 consists of this example in one with the chassis 10, a stator core 7 is fixed to a chassis 10, and since it has dissociated with the motor sub assembly, the thing by the configuration of a chassis 10 for which a motor sub assembly is assembled as a motor assembly ** becomes possible. And since a chassis 10 can be equipped in the state of this motor assembly, correspondence becomes possible at the chassis of many forms.
[0036] (Example 4) Next, the 4th example of this invention is explained with reference to drawing 5 and drawing 6 . In drawing 5 and drawing 6 , the stops 17 from which a configuration differs are used in connection with the configurations of the sleeve section 3 differing by this example. Moreover, the Rota frame 20 which fixed the magnet 6 at the inner circumference of the periphery

body is being fixed to the s[redacted] of the rotor hub section 2 in the cup co[redacted]uration. Moreover, a printed circuit board 19 is a[redacted]ed in the base of housing 1, and the lea[redacted]nd-of-line end of a coil 8 is soldered.

[0037] The stop implement 17 is explained. It does not function in the configuration where it opened the simple circular hole to which the stop implement 17 lets the sleeve section 3 pass since the path a of the fitting section [as opposed to / like / illustration] body 1a of housing 1 in the sleeve section 3 / was larger than the path b of a height 11. Then, the hole of a top-joint form which has the minor diameter section 19 which can engage with a height 11 where it stopped with the major-diameter section 18 which can let the sleeve section 3 pass to the stop implement 17 and an ingredient 17 is attached in the rotor hub section 2 is formed. And the major-diameter section 18 is used at the time of insertion of the stop implement 17, and it is made for the minor diameter section 19 to contact a height 11 in the state of assembly. If this stop implement 17 is used, even if the path of a height 11 is smaller than the path of the sleeve section 3, a motor can be assembled by the built-in method.

[0038] If the size relation of the parts of a motor is summarized, it will become like the following (3) formulas.

[0039]

a>=b and -- a>e and -- b>e ... (3)

However, the path of b and the minor diameter section 19 of stops 17 is set [the path of housing 1 and the sleeve section 3 which fits in] to e for the path of a and a height 11.

[0040] (Example 5) Next, the 5th example of this invention is explained with reference to drawing 7 and drawing 8 . In drawing 7 and drawing 8 , by this example, basic composition is the same as the 4th example of the above, and stops 22 differ from stops 17. Stops 22 are circular, and it is in the state attached in the rotor hub section 2, among those the periphery 23 is constituted by a part of height 11 of the sleeve section 3 possible [contact].

[0041] In the state where these stops 22 were included in the motor, if the curtate distance from the axis of a shaft 4 to the inner circumference section 23 of stops 22 is set to f, the relation which transposed e of (3) formulas to f to which it is given by the following (4) formulas theoretically will be realized.

[0042] 2 f=e .... (4)

In this example, upper shell insertion cannot be carried out through sleeve 3 outer diameter, but it can insert and equip with stops 22 from a side so that drawing 8 may show. Thus, since it inserts from a side, various configurations can respond about stops 22. Moreover, after attaching stops 22 in a motor sub assembly like the 4th example, if a stator assembly is fixed to the motor sub assembly, it will become the hydrodynamic bearing spindle motor of a built-in type.

[0043] (Example 6) Next, the 6th example of this invention is explained with reference to drawing 9 . In drawing 9 , this example is the same composition as fundamentally as the 4th example of the above, and the housing section 15 is constituted in [a different point / the chassis 10 of a disk driving gear] one. Moreover, thrust bearing consists of pivot bearing 16. Since the housing section 15 consists of this example in one with the chassis 10, a stator core 7 is fixed to a chassis 10, and since it has dissociated with the motor sub assembly, the thing by the configuration of a chassis 10 for which a motor sub assembly is assembled as a motor assembly ** becomes possible.

[0044] And since a chassis 10 can be equipped in the state of this motor assembly, correspondence becomes possible at the chassis of many forms.

[0045] (Example 7) Next, the 7th example of this invention is explained with reference to drawing 10 . In drawing 10 , the soffit minor diameter section 24 which made the outer diameter the soffit section which closes the thrust board 5 of the sleeve section 3 in the minor diameter is formed in each above-mentioned example by this example.

[0046] Since the portion corresponding to the periphery section of the thrust board 5 of the sleeve section 3 is considering as the soffit minor diameter section 24 by this example although a path swells by the caulking if caulking fixation of the thrust board 5 is carried out at the sleeve section 3 Although a path swells by the caulking, there is no influence of the swelling in the path of partial 3a which fits in to body 1a of HAUJIJINGU 1 of the sleeve section 3, and the sleeve section 3 can be inserted in body 1a of housing 1 convenient.

[0047] (Example 8) Next, the octavus example of this invention is explained with reference to

drawing 11 . In drawing 11 [redacted] circumferential circle cylinder part 25 [redacted]ch the Rota frame 20 is being fixed to the rotor hub [redacted]ion 2 like the 4th example, and fits into [redacted] Rota frame 20 of this example at the inner circumference of the rotor hub section 2, and the lobe 26 projected towards the periphery of the sleeve section 3 from the upper limit are formed, and it consists of this examples so that this lobe 26 may function to a height 11 as stops which can be engaged from a lower part. In addition, the bore of a lobe 26 is equivalent to c of (1) formula.

[0048] The assembly procedure of the hydrodynamic bearing spindle motor of the above composition is explained. The stator assembly which fixed the stator core 7 ****(ed) by housing 1 in the coil 8, the sleeve bearing assembly which fixed the thrust board 5 to the sleeve section 3, the Rota frame assembly which fixed the magnet 6 to the Rota frame 20, and the Rota assembly which fixed the shaft 4 to the rotor hub section 2 are made, respectively. Next, a lubricating oil is lubricated into the sleeve section 3 of a sleeve bearing assembly, the shaft 4 of the Rota assembly is inserted, a lotus reeve assembly is made, from the thrust board 5 side of the sleeve section 3 in the lotus reeve assembly, insertion fitting of the circumferential circle cylinder part 25 of the Rota frame assembly is carried out, it fixes to the inner circumference of the rotor hub section 2, and a motor sub assembly is made. Then, the lobe 26 which functions as stops is in the state which can engage with the height 11 which protruded on the upper-limit outside periphery of the sleeve section 3 from a lower part. Then, assembly is completed by inserting the sleeve section 3 in body 1a of the housing 1 of a stator assembly, and fixing.

[0049]

[Effect of the Invention] Since the stops escaped from and regulated in contact with a salient are prepared if according to the hydrodynamic bearing spindle motor of this invention a salient is prepared in the sleeve section and it moves in the thrust direction at a rotor hub section side so that clearly from the above explanation, by making the size of the sleeve section, a salient, and stops the regular relation, a motor can be assembled by the built-in method, rationalization of assembly can be attained, and a hydrodynamic bearing spindle motor can be manufactured cheaply.

[0050] Moreover, it can assemble similarly by stopping, even when the path of the fitting section with housing of the sleeve section is larger than the path of a salient, and forming the hole of the radius of curvature more than the overall diameter of the range from the thrust board side of the sleeve section to a salient in detail.

[0051] Moreover, even if stops are configurations which contact a salient partially, they can be assembled similarly, and even if housing is the chassis of equipment, and one, they can be assembled similarly.

[0052] Moreover, by making a path small near the caulking section of the thrust board of the sleeve section, although a path swells by the caulking, the sleeve section can be smoothly inserted and fitted in in housing.

[0053] Moreover, it is not necessary to prepare stops separately and, in the Rota composition which attached the Rota frame in the rotor hub section, part mark and the number of erectors can be lessened by making the Rota frame into stops.

[Translation done.]

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is the cross section of the 1st example of the hydrodynamic bearing spindle motor of this invention.
[Drawing 2] It is the cross section of the 2nd example of the hydrodynamic bearing spindle motor of this invention.
[Drawing 3] It is the perspective diagram showing the stops of this example, and the relation of the sleeve section.
[Drawing 4] It is the cross section of the 3rd example of the hydrodynamic bearing spindle motor of this invention.
[Drawing 5] It is the cross section of the 4th example of the hydrodynamic bearing spindle motor of this invention.
[Drawing 6] It is the plan of the stops of this example.
[Drawing 7] It is the cross section of the 5th example of the hydrodynamic bearing spindle motor of this invention.
[Drawing 8] It is the perspective diagram showing the stops of this example, and the relation of the sleeve section.
[Drawing 9] It is the cross section of the 6th example of the hydrodynamic bearing spindle motor of this invention.
[Drawing 10] It is the cross section of the thrust board caulking section of the sleeve section of the 7th example of the hydrodynamic bearing spindle motor of this invention.
[Drawing 11] It is the cross section of the octavus example of the hydrodynamic bearing spindle motor of this invention.
[Drawing 12] It is the cross section of the hydrodynamic bearing spindle motor of the conventional example.
[Description of Notations]
1 Housing
2 Rotor Hub Section
3 Sleeve Section
4 Shaft
5 Thrust Board
10 Chassis
11 Height
12 Stops
13 Stops
15 Housing Section
17 Stops
20 Rota Frame
22 Stops
24 Soffit Minor Diameter Section
26 Lobe

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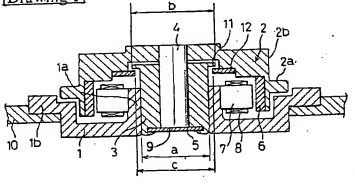
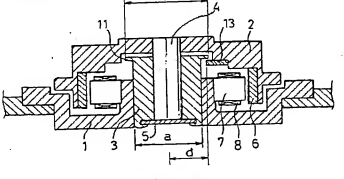
DRAWINGS

[Drawing 1]



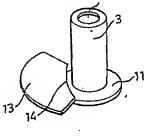
1…ハウジング
2…ロータハブ部
3…スリーブ部
4…シャフト
5…スラスト板
11…突起部
12…止め具

[Drawing 2]

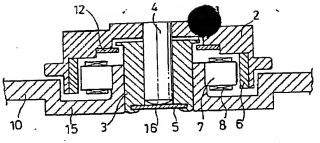


13…止め具

[Drawing 3]

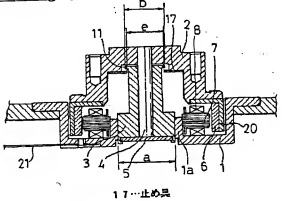


[Drawing 4]



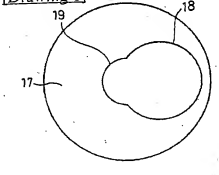
10…シャーシ
15…ハウジング部

[Drawing 5]

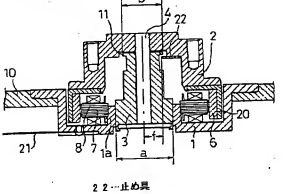


17…止め具

[Drawing 6]

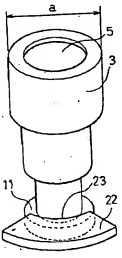


[Drawing 7]

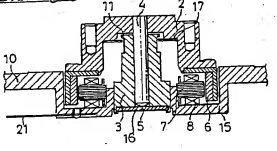


22…止め具

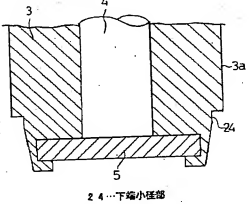
[Drawing 8]



[Drawing 9]

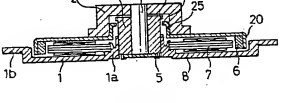


[Drawing 10]



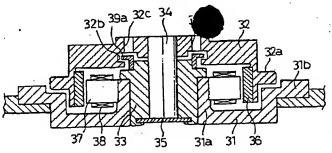
24…下端小径部

[Drawing 11]



26…突出部

[Drawing 12]



[Translation done.]